

VT Center for Geographic Information

VT Open Geodata Portal: ArcGIS Server Web Services Configuration Guidelines

Version – 1.0



Vermont Center for Geographic Information
A Division of the Agency of Commerce and Community Development

Updates

Date	Notes
05/24/2016	Draft 1.0
08/17/2016	Draft 2.0
10/12/2016	Final 1.0 - <PENDING EGC APPROVAL>

Statutory Authority and Standard Review/Approval

The Vermont Center for Geographic Information (VCGI) has the statutory authority¹ to craft and adopt VT GIS standards and guidelines. Over the past 20 years, VCGI has worked with the VT GIS community to carefully craft these standards and guidelines, helping to ensure that Vermont GIS (VGIS) data “is compatible with, useful to” others in the VT GIS community.

In 2015, VCGI was reformed as a Division under the Agency of Commerce and Community Development (ACCD) as defined in H.885 Sec. E. 800.1 10 V.S.A. § 122. VCGI's duties did not change, and therefore VCGI still has the authority to adopt VT GIS standards and guidelines.

The State’s Enterprise GIS Consortium (EGC) has been established as the organization responsible for reviewing and approving Vermont GIS standards crafted by VCGI (in collaboration with the Vermont GIS Community).

¹ <http://legislature.vermont.gov/statutes/fullchapter/10/008>

I. Purpose

This guideline outlines best practices for creating ArcGIS Server web services and registering them with AGO for the purpose of supporting the federating VT Open Geodata Portal.

II. Applicability

There are two primary types of AGS web services relevant for use with the VT Open Geodata Portal:

- Map services
- Image services

The majority of publishers will use Map Services to publish their data. *Guidelines for publishing Image Services are beyond the scope of this document*². This document is therefore intended to aid in the development of Map Services only.

III. ArcGIS Server Web Services Configuration Guidelines

In order to leverage ArcGIS Online's (and the AGO Open Data platform's) full set of capabilities, it is best to register "AGO items" as "feature layers". This can be done with ArcGIS Server (AGS) by creating one or more ArcGIS Map Services. Individual layers within these services can then be registered with ArcGIS Online (AGO) by adding them as "items". These are then "shared" with ArcGIS Open Data as available "open data groups".

- a. Web Services Naming Convention:** The following naming convention is recommended. It's a good idea to use the same naming convention for your MXD files used to create the services.

OPENDATA_<Agency>_<name>_<SP|WM³>_<CACHE|NOCACHE>v<version#>

- Example: OPENDATA_VCGI_LAYERS1_SP_NOCACHE_v1

NOTE: Publishers should store their services in the ./EGC_services folder since the VT Open Geodata Portal is a VT Enterprise GIS Consortium (EGC) platform design to support those inside and outside of state government with consistent and stable services.

- b. Number of Web Services:** The data layers you wish to share via the VT Open Geodata Portal should be bundled into one or more AGS web services (usually Map services). However, it's important to note that AGS services can become unstable when there are "too many"

² It is anticipated that VCGI is the only organization that will be publishing Image Services in the foreseeable future.

³ SP = Vermont State Plane Meters NAD83, WM = Web Mercator

layers added to a single service. The exact number is uncertain, however, its best to plan for scalability (growth). This can be done via numbering system:

- OPENDATA_VCGI_LAYERS1_SP_NOCACHE_v1

Once the number of layers in the “LAYERS1” exceeded a certain count (let’s say 100), you could begin adding new layers to a “LAYERS2” service.

Alternatively, one could use a descriptive name such as the ISO Theme. VCGI uses the following for its Open Data services. However, this may be unnecessary for most publishers.

<ul style="list-style-type: none"> • OPENDATA_VCGI_AGRICULTURE_SP_NOCACHE_v1 • OPENDATA_VCGI_BASEMAPS_SP_NOCACHE_v1 • OPENDATA_VCGI_BOUNDARIES_SP_NOCACHE_v1 • OPENDATA_VCGI_CADASTRAL_SP_NOCACHE_v1 • OPENDATA_VCGI_CLIMATE_SP_NOCACHE_v1 • OPENDATA_VCGI_DEMOGRAPHIC_SP_NOCACHE_v1 • OPENDATA_VCGI_ECOLOGIC_SP_NOCACHE_v1 • OPENDATA_VCGI_ECONOMIC_SP_NOCACHE_v1 • OPENDATA_VCGI_ELEVATION_SP_NOCACHE_v1 • OPENDATA_VCGI_EMERGENCY_SP_NOCACHE_v1 • OPENDATA_VCGI_ENVIRONMENT_SP_NOCACHE_v1 	<ul style="list-style-type: none"> • OPENDATA_VCGI_FACILITIES_SP_NOCACHE_v1 • OPENDATA_VCGI_GEODETTIC_SP_NOCACHE_v1 • OPENDATA_VCGI_GEOLOGIC_SP_NOCACHE_v1 • OPENDATA_VCGI_HEALTH_SP_NOCACHE_v1 • OPENDATA_VCGI_IMAGERY_SP_NOCACHE_v1 • OPENDATA_VCGI_LANDUSE_SP_NOCACHE_v1 • OPENDATA_VCGI_RECREATION_SP_NOCACHE_v1 • OPENDATA_VCGI_TRANSPORTATION_SP_NOCACHE_v1 • OPENDATA_VCGI_UTILITIES_SP_NOCACHE_v1 • OPENDATA_VCGI_WATER_SP_NOCACHE_v1
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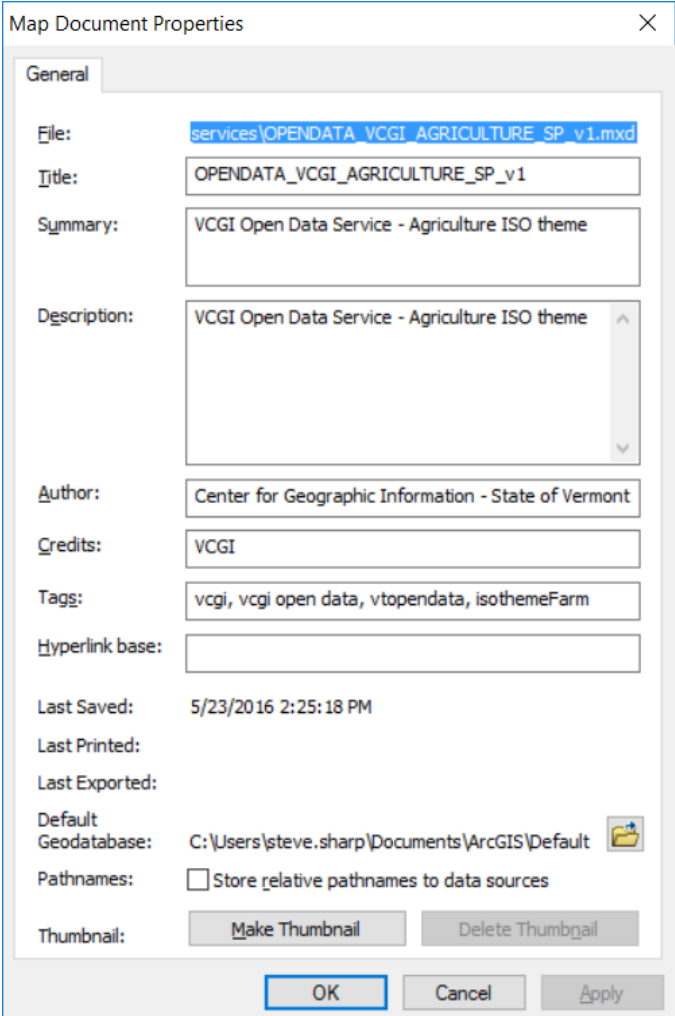
c. ArcGIS MXD Configuration Settings: There are certain things you should set in your ArcGIS Map Document (MXD).

i. Data Frame Properties:

- **MOST IMPORTANT** - under Data Frame Properties, enable (✓) “Allow assignment of unique IDs for map service publishing” under the General tab. A basic entry within Description is a good idea too.
- Under the Coordinate System tab, set Coordinate System to “NAD_1983_StatePlane_Vermont_FIPS_4400”.

The screenshot shows the 'Data Frame Properties' dialog box with the 'General' tab selected. The 'Name' field is 'OPENDATA_VCGI_AGRICULTURE_SP_v1'. The 'Description' field contains 'VCGI Open Data Service - Agriculture'. The 'Credits' field contains 'VCGI'. The 'Units' section shows 'Map' and 'Display' both set to 'Meters'. The 'Reference Scale' is set to '<None>', 'Rotation' is '0', and 'Label Engine' is 'Standard Label Engine'. At the bottom, two checkboxes are visible: 'Simulate layer transparency in legends' (checked) and 'Allow assignment of unique IDs for map service publishing' (checked). The second checkbox is circled in red. The 'OK', 'Cancel', and 'Apply' buttons are at the bottom right.

ii. Map Properties: Populate all elements, using the following as an example:



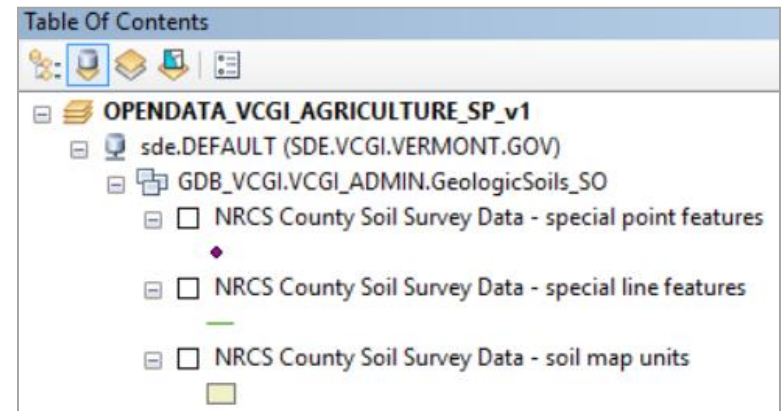
The screenshot shows the 'Map Document Properties' dialog box with the 'General' tab selected. The fields are populated with the following information:

- File:** services\OPENDATA_VCGI_AGRICULTURE_SP_v1.mxd
- Title:** OPENDATA_VCGI_AGRICULTURE_SP_v1
- Summary:** VCGI Open Data Service - Agriculture ISO theme
- Description:** VCGI Open Data Service - Agriculture ISO theme
- Author:** Center for Geographic Information - State of Vermont
- Credits:** VCGI
- Tags:** vcgi, vcgi open data, vtopendata, isothemeFarm
- Hyperlink base:**
- Last Saved:** 5/23/2016 2:25:18 PM
- Last Printed:**
- Last Exported:**
- Default Geodatabase:** C:\Users\steve.sharp\Documents\ArcGIS\Default
- Pathnames:** ☐ Store relative pathnames to data sources
- Thumbnail:** Make Thumbnail, Delete Thumbnail

Buttons at the bottom: OK, Cancel, Apply.

d. Adding and Naming Layers in Web Service

- i. **Adding Data:** Ideally data layers should be added from an Enterprise Geodatabase (Esri ArcSDE enabled database) that is compliant with Vermont's ArcSDE Configuration Guidelines (eg: layers stored in GDB_ANR...ANR's "publishing database"). However, it's also possible to add layers from other sources (eg: File Geodatabase, shapefiles, etc.), but you'll need to upload these to your ArcGIS Server when you publish the service. Your choice if you want the added layers to default on/off (visibility).
- ii. **Layer Name in Table of Contents:** Once you add a layer you'll need to give it a name in the table of contents. Use a "user friendly" name. If a particular dataset contains more than one feature class (eg: a feature dataset with multiple features), then assign a user friendly name to each of those (eg: BNDHASH → State Boundary, County Boundaries, Town Boundaries, etc.). It is generally recommended that you keep the naming relatively short (< 75 characters). If the data is limited to a particular geographic (eg: Chittenden County), then you may want to include that in the name.



- iii. **Layer Properties:** Under the Properties for each layer, set the General properties similar to the following example. You may want to set the “minimum scale” to something smaller than 3,000,000 for very large datasets (eg: 2ft contours). *NOTE: Its important that the Layer ID values always be unique and not change. This will automatically happen if you followed the guidelines to enable the “Allow assignment of unique IDs for map service publishing” under the General tab of the Data Frame Properties.*

Layer Properties

The screenshot shows the 'Layer Properties' dialog box with the 'General' tab selected. The 'Layer Name' is 'NRCS County Soil Survey Data - special point features' and the 'Visible' checkbox is checked. The 'Description' is 'Natural Resource Conservation Service County Soil Survey Data - special point features'. The 'Credits' are 'VCGI' and the 'Layer ID' is '10'. The 'Scale Range' section is expanded, showing options to specify the range of scales at which the layer will be shown. The 'Show layer at all scales' radio button is selected. The 'Out beyond' field is set to '1:3,000,000' (minimum scale) and the 'In beyond' field is set to '<None>' (maximum scale). There are two globe icons on the right side of the dialog box.

General	Source	Selection	Display	Symbology	Fields	Definition Query	Labels	Joins & Relates	Time
Layer Name: NRCS County Soil Survey Data - special point features <input type="checkbox"/> Visible									
Description: Natural Resource Conservation Service County Soil Survey Data - special point features									
Credits: VCGI									
Layer ID: 10									
Scale Range You can specify the range of scales at which this layer will be shown: <input type="radio"/> Show layer at all scales <input checked="" type="radio"/> Don't show layer when zoomed: Out beyond: 1:3,000,000 (minimum scale) In beyond: <None> (maximum scale)									

e. Configuring and Publishing Web Services: The following settings are recommended when publishing your MXD(s) as a web services for use by the VT Open Geodata Portal.

i. Settings: (use defaults unless specified)

- 1. Service Name:** Use the naming convention defined in this guideline (eg:
OPENDATA_VCGI_ENVIRONMENT_SP_NOCACHE_v1)
- 2. Folder:** Publish Service to ./EGC_services folder
- 3. Service Editor Properties:**
 - a. Capabilities:**
 - ✓ Mapping
 - ✓ Allow per request modification of layer order and symbology
 - ✓ WMS
 - Name, Title, Abstract, Keyword
 - ✓ KML – Optional (default settings)
 - 4. Item Description:** Populate all. It should have carried over from MXD if you populated it.

WMS

REST URL:

SOAP URL:

Operations allowed:

☒ GetCapabilities ☒ GetLegendGraphic ☒ GetSchemaExtension
☒ GetFeatureInfo ☒ GetMap ☒ GetStyles

Properties

☒ Enter service properties below ☐ Use external capabilities files

Property	Value
Name	OPENDATA_VCGI_AGRICULTURE_SP_v1
Title	OPENDATA_VCGI_AGRICULTURE_SP_v1
Abstract	VCGI Open Dta Service - Agriculture ISO Theme
Keyword	vcgi, vcgi open data, vtopendata, isothemeFarm
ContactPerson	
ContactPosition	
ContactOrganization	
AddressType	
Address	
City	

SLD Path or URL:

Additional spatial reference systems:

☐ Use layer names from the map document

IV. Web Services Version Management: Each web service should be assigned a version number (v#) as defined in the naming convention above. The 1st release of a service should be tagged as “v1”. As “substantive” changes (eg: layers removed, schema’s modified) are made to the service the version number should be incremented by 1 (eg: v2). The previous version should be retained as outlined in the Life Cycle Support Policy guidelines outlined below.

V. Life Cycle Support Policy: A Life Cycle Support Policy is designed to help communicate to users the technical resources available during a web service's life span and to provide advanced notification of planned changes to services offered by EGC partners. Agencies choosing to publish/host web services in support of VT’s Open Geodata Portal should publish a Life Cycle Support Policy using the VT Enterprise GIS Consortium’s (EGC’s) Life Cycle Support Policy template.

- VI. Server Upgrades:** Server and ArcGIS Server upgrades (eg: new versions, service packs) could impact the ability of client software (eg: ArcGIS Desktop, web and mobile apps) to utilize AGS services. Therefore, agencies choosing to publish/host publish/host web services in support of VT's Open Geodata Portal should give notice (eg: 30 days) before they upgrade (or patch) ArcGIS Server instance(s). Ideally notice should be given by 1) updating their Life Cycle Support Policy, 2) and notify users via VGIS-L of the pending upgrade.
- VII. Web Service Maintenance and Outages:** There are times when ArcGIS Server web services need to be stopped to facilitate routine maintenance (eg: data updates, server updates). Agencies choosing to publish/host web services in support of VT's Open Geodata Portal should give users 24 hours' notice before stopping services for routine maintenance. Notice should be sent out on the VGIS-L listserv. The notice should include the date, time, and anticipated timeframe of the outage. Outages associated with routine maintenance should be limited to 24 hours or less. The status of any "unplanned" outages (eg: server crash) lasting more than 2 hours should be forwarded to VGIS-L.
- VIII. Deploying Services on HTTPS:** Agencies publish/host web services in support of VT's Open Geodata Portal are strongly encouraged to offer such services over HTTP and HTTPS. This allows application developers to avoid "mixed content" vulnerabilities and browser errors.